AppleWorks Forum

The Monthly Publication of **NAUG:** ***The National AppleWorks Users Group***

Volume II, No. 10 **Three Dollars**

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Support for AppleWorks & ///EZ Pieces Users

An Exciting Year for AppleWorks Users

by Cathleen Merritt

Judging from last month's AppleFest show, AppleWorks users are in for an exciting year. AppleFest saw the introduction of nine products that enhance our favorite program.

Beagle Bros

Seven of the products are from Beagle Bros, developers of MacroWorks and Super MacroWorks. These AppleWorks enhancements, called collectively the "Timeout" series, are significant because they work within AppleWorks; i.e., you do not have to clean up the AppleWorks desktop and quit AppleWorks before using these programs. The Timeout series includes the following modules (all purchased separately):

- UltraMacros, the ultimate macro program
- Desktools, Beagle Bros' answer to the Pinpoint Desk Accessories
- Superfonts, a major upgrade to the FontWorks program
- Quickspell, a fast spelling checker
- Graph; produces graphs and charts from spreadsheet and data base files
- Filemaster; manages disk files from within AppleWorks
- Sidespread; prints spreadsheets sideways.

Some of the products were sold at the show, while others will be available shortly.

Pinpoint Publishing

Pinpoint Publishing introduced "The Graphic Edge", a business graphics program that converts AppleWorks spreadsheet files into attractive graphs. The Graphic Edge has a number of noteworthy features, including a full screen editor to let you add labels and pictures to your graphs and a one-way "hot link" (changes in a spreadsheet are also made in the corresponding graph.)

Zip Technology

The "sleeper" of the show is the Zip Chip; a replacement for the 65C02 microprocessor in your //e or //c. This chip speeds up your Apple about four times its normal operating speed. If the Zip Chip works as advertised, //c owners will be able to enjoy the greater speed currently available to //e owners with TransWarp cards. Apple //e owners will be able to speed up their computers without using a precious slot and without the heat and power supply problems associated with using accelerator cards. We remain cautious, however. While Zip Technology demonstrated the operation of a Zip Chip in a closed //c, Zip Chips were not available for review or examination.

Recommendations

All the software products described here are exciting additions to the AppleWorks family. But each represents a complex bit of programming and each is so new that I am not convinced they are completely debugged. As any programmer knows, it's almost impossible to write bug-free programs that are this complex. A suggestion: If you are a pioneer who enjoys being at the leading edge of AppleWorks developments, get all eight software products and start exploring. These are exciting products. However, if you use AppleWorks primarily as a productivity tool, be patient; I believe you'll experience less frustration if you wait a few months and buy the second version of these programs.

If the Zip Chip works as advertised, I think it is a significant upgrade for the //e and //c. But I'm going to be certain it works as claimed before I replace the "heart" of my computer.

AppleWorks Forum

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Letters to NAUG

A Knowledgeable Student Leaves His Mark

Dear Cathleen,

We recently had a problem with AppleWorks at our high school. Every time a document was printed, a particular student's name appeared on the first line of print to the far left. Yet that student's name wasn't on the file I was printing. The problem appeared to be on our program disk. When I printed the same documents from a different program disk, the problem went away. How could the student have done this?

William Brescia
Philadelphia, Mississippi

[Ed: Leave it to high school students to figure out a way to "leave their mark". The student probably entered his name as part of the printer initialization string available on the Change A Printer Menu. Any text you enter here will be printed at the top of every document. Can anyone make constructive use of this AppleWorks "feature"?]

How to Copy SEG.PR

Dear Cathleen,

I am trying a trick described in a recent ***AppleWorks Forum;*** transferring my printer setup codes from my working copy of AppleWorks version 1.3 to my new version 2.0. However, when I try to copy SEG.PR from one disk to the other, I get an error message saying "PATHNAMES INDICATE SAME FILE". Please help.

Morey Behrens
West Linn, Oregon

The ***National AppleWorks Users Group*** **(NAUG)** is an association that supports AppleWorks users. The group provides assistance to members and information about the AppleWorks program and applications of the program. Our primary means of communication with members is through the monthly newsletter entitled the ***AppleWorks Forum***.

[Ed: Some copying programs (e.g., Copy //+) won't copy between two disks that have the same volume name. Since both AppleWorks versions 1.3 and 2.0 are on disks named "AppleWorks", you get an error message when you try to copy from one disk to the other. If you get a message indicating you have two disks with the same volume name in your computer, use the RENAME function of your copying program to temporarily rename either of the disks from "AppleWorks" to any other name. Make your copy and then change the name of the disk back to "AppleWorks".

Other copying programs will not let you copy a file onto a disk if a file with the same name already exists on that disk. If that happens, use a utility program to delete the original SEG.PR file from your working copy of AppleWorks version 2.0. You will then be able to copy the SEG.PR file from version 1.3 onto 2.0.]

Help Setting Up Auto-Boot Disks

Dear Cathleen,

I'm trying to follow the directions in the March 1987 issue of the ***AppleWorks Forum*** on how to create an auto-boot disk that configures my RamWorks card as a RAM disk and loads programs onto that "disk". The instructions say to copy the file AUTOCOPY from my AppleWorks Desktop Expander disk. However, there is no such file on my disk. I have version 5.0.4 of the desktop expansion software. Do I have the wrong disk?

George Drott
Arvada, Colorado

[Ed: AUTOCOPY appears on version 5.3 of the AppleWorks Super Desktop Expander software from Applied Engineering. You can get version 5.3 from Applied Engineering (send them $10) or from a local dealer.

If you're not interested in creating your own auto-boot disk, there are some commercial products that will do the work for you. If you have an

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Applied Engineering card, a program called RAM-UP from Quality Computing ($39.95) automates the process of defining a RAM disk and loading programs onto your memory card. If you own a Checkmate Technology memory card, you can purchase AUTORAM SYSTEM from Checkmate Technology ($19.95); it serves the same function.]

Member Needs a Command Tree

Dear Cathleen:

Are you aware of the availability of a "command tree" for AppleWorks? I'm looking for a schematic of how the different commands interrelate. That is, starting in the word processor, when you select one command, what options does it open up? I've seen such command trees for SuperCalc and Lotus 1-2-3. Why not for AppleWorks?

David Jones
Richmond, Virginia

[Ed: We were unable to locate a complete command tree for AppleWorks. Can any of our members help?]

Lengthy Reports "Creep" Down the Page

Dear Cathleen,

When printing reports from AppleWorks' data base and spreadsheet modules, my printer can't fit the page number and date at the right hand edge of the page. Instead, it goes to the next line and prints the page number and date, like this:

```
File: Addresses                    Page
1
Report: Listing
09/23/87
```

In addition, AppleWorks does not count the two extra lines it inserts for the page number and the date when it figures the page breaks. Hence, on a lengthy report, the text gets lower and lower on subsequent pages. Soon, if unattended, it goes over to the top of the next page. What's my problem? (I use Appleworks version 1.3 with an Epson LX-80 printer connected through a Grappler+ interface card.)

Larry Freeman
Garden Grove, California

[Ed: AppleWorks counts every linefeed it sends to the printer to keep track of your position on the printed page. In your example, however, the linefeeds are being generated by either your printer or your printer interface card, not by AppleWorks. As a result, AppleWorks has no idea that the reports are creeping down the page.

The date and page number should print at the right hand edge of the page. Did you use the Apple-O command to set your platen width at 8.5 inches? The correct platen width setting is the portion of the platen on which the print head can print. Many printers (e.g., the LX-10 and the ImageWriter printers) have an 8.5 inch-long rubber platen, but the print head can only print on 8 inches of that platen. Make certain your platen width is set to 8.0 inches.

In addition, the Grappler+ requires an unusual printer initialization sequence. The correct initialization code for the Grappler+ is Control-I ØN. See the April 1987 issue of the ***AppleWorks Forum*** *for the codes for nine popular printer interface cards.]*

Local NAUG Groups?

Dear Cathleen:

Does **NAUG** have plans for local AppleWorks Users Groups?

Rick Schutz
Burke, Virginia

[Ed: No. Most local groups have so many AppleWorks users that they've established "Special Interest Groups" (SIGs) for AppleWorks. You can get the name of a local Apple users group by calling Apple Computer's User Group Referral Number (800) 538-9696 (extension 500). If you have not attended a users group meeting, it can be a lot of fun and very informative.]

Improving AppleWorks' "Tabs" System

by Cathleen Merritt

Here's how to make it easier to print fancy charts and tables in AppleWorks documents.

Those of us who use AppleWorks as our only word processing program, probably find its tab system adequate. But AppleWorks does not offer some of the features available on full-function word processors; features like "decimal tabs" (to line up the decimal points in a column of numbers), "center tabs" (to center a column of text), or "right tabs" (to right justify a column of text). And while we're at it, why not dream about arithmetic functions that automatically find the sum or average of a column of numbers after you enter your data?

Fortunately, you can get all these features in AppleWorks, but you have to know where to look.

Use the Spreadsheet

The trick to doing charts and tables in AppleWorks is to use the spreadsheet module to prepare the table and the AppleWorks clipboard to move your table into your word processor document.

How to do It

When you want to prepare a table, return to the Main Menu and declare that you want to create a new spreadsheet. Here are some suggestions to get the "tab" features you want:

1. Start your work in Column A of the spreadsheet, using one column of the spreadsheet for each column of data in your chart. Don't worry now about getting the table centered on your screen; later you will move your table over to the word processor and you will control the placement in the word processor module.
2. Don't leave blank columns; change the column widths (using the Apple-L command) to get the spacing you want between columns.
3. Try to keep your table narrow; you want it to fit within the margins of your word processor document. For example, if you want to print your table at 10 characters per inch with 1-inch left and right margins, your table should be no more than 60 characters wide. (That was calculated as follows: An 8-inch platen width less 2 inches for the left and right margins yields a 6-inch printing line. Six times 10 characters per inch yields 60 characters per line.)

   You can check the width of your spreadsheet by issuing an Apple-P command and declaring that you want to print "All" your work. AppleWorks will tell you the number of characters you will print on each line. This is an important step...make certain your table is no wider than a single line in your final word processor document.
4. Use the Apple-L command to get the columns formatted the way you want. For example, you can line up decimal points by declaring you want the values displayed in Fixed format. You can insert dollar and decimal signs by declaring you want the values displayed in Dollar format. You can right justify or center text by declaring you want to change the format of labels.
5. Use the @SUM and @AVG functions to get totals and/or averages at the bottom of a column.

(continued on the next page)

6. You won't want the report header that usually appears at the top of a printed spreadsheet. You can turn off that header by issuing a Page Header (PH) Command from the Options Menu (Apple-O) in the spreadsheet. Don't bother changing the print size and margin settings on the spreadsheet Options Menu; those settings are ignored when you print to the clipboard.
7. When you are done preparing your table in the spreadsheet module, "print" your spreadsheet "To the clipboard" for use in the word processor. You "print" to the clipboard by issuing an Apple-P command, selecting "All" to print your entire spreadsheet, and selecting "The clipboard (for the word processor)" at the Printer Menu. Then issue an Apple-Q command to return to your word processor document.

Working with the Table

Now your table is on the clipboard, waiting to be placed in your word processor document.

Move the cursor to the point in your document where you want the table to appear, issue an Apple-C command and indicate you want to copy "From the clipboard". The table will appear on your screen in your document.

It's unusual for the table to be formatted correctly when it first appears on your screen. Typically the table is either (1) too narrow and not properly centered on the page, or (2) jumbled on your screen.

Formatting the Table in the Word Processor

If the table is narrow, you should center the table mid-way between the margins. Sometimes you can center the text by using the Center Command in the word processor module. However, the Center Command usually does not line up your table properly. You can center the table by changing the left margin in the word processor document.

To change the left margin, put the cursor at the beginning of the table, go to the Options Menu in the word processor, and change the left margin setting until you get the table centered. Remember that you want to center your table under the column of text you're printing. That will not necessarily center the table in the screen.

You can make it easier to find the center of your text by creating a "Centering Guide" on the screen. Create your centering guide by entering a Center Command from the Options Menu and entering a single character (I like the vertical line above the RETURN key on my //e). You can use that character as a guide to the center of the printed page.

Unfortunately, you will probably have to fiddle with this margin setting after you print a draft of your document.

What to do if the Table Appears Jumbled

Your job is more difficult if your table is jumbled on the screen. The jumbled screen occurs if the table is too wide to display properly. However, some documents will print correctly even if they appear jumbled. That is because AppleWorks can print, but cannot display, more than 78 characters on a line. (For more information about this problem, see the Word Processor Tips article entitled "Understanding the Difference Between What You See and What You Get" in the April 1987 issue of the *AppleWorks Forum*.)

Here's how to proceed if the table is jumbled on your screen:

1. First you should determine if the table is too wide to print correctly. Even though the display is scrambled, print a copy of the

(continued on the next page)

Keep in Touch with Other AppleWorks Users

Call the **Electronic Forum**, the Bulletin Board of
The National AppleWorks Users Group

Phone (313) 482-8090
(300 or 1200 baud)
Richard Lewandowski, Sysop

table. If the printed output is correctly formatted, your table has more than 78 characters per line but still fits in your printed document. If that is true, don't worry about the format of the document on the screen; it will print correctly.

2. If your printout is still scrambled, your table is too wide to print within the margins of your word processor document. You will either have to (a) change the option settings in the word processor module to allow more characters per line, or (b) make the original table narrower.

   You can fit more characters on each printed line by printing the table at 17 characters per inch and by making your left and right margins narrower. Remember that as soon as you try to display more than 78 characters per line, your screen will no longer provide an accurate representation of what will appear on the printed page. You will have to print a copy of the table to check the formatting.

3. If the table still does not fit, you will have to make your spreadsheet narrower. To do that, delete the spreadsheet from your word processor document (using the Apple-D command), return to the spreadsheet module and make each column narrower by using the Apple-L or Apple-V command. Once again, check the width of the table by issuing an Apple-P command and telling AppleWorks you want to print "All" your spreadsheet. Make certain each line is no longer than the number of characters you can fit on a line of your word processor document. Then print a new copy of your table onto the clipboard and copy the new table from the clipboard into your word processor document.

Once you become comfortable with moving spreadsheets into word processor documents, you'll find that the formatting powers available in the spreadsheet allow more "tab" functions in AppleWorks than are available in most other microcomputer word processing programs. ▒

Quick Tip

Use an Okidata Printer?

If you use an Okidata printer, you can get free telephone support from Okidata. Call (800) OKI-DATA for help. The folks who answered the phone when we called were helpful and knowledgeable about using their printers with AppleWorks.

Whether or not you have an Okidata printer, you might want to call the company and request their Okidata Users Tip #4005, "Using AppleWorks With Okidata Printers". This 20-page document is an excellent primer on how to install a custom printer onto AppleWorks. In addition, the booklet does not appear to be protected by copyright. ▒

TAX PRACTITIONERS SOFTWARE

PREPARE FORM 1040 SCHEDULES USING YOUR APPLE// COMPUTER AND APPLEWORKS

Form 1040, schedules and numbered I.R.S. forms may be formatted using your APPLEWORKS program and our two form disks. One disk contains Form 1040, Schedules A, B, C, D, E, F, and SE. Disk two contains Forms 2106, 2119, 2210, 2441, 3903, 4562, 4972, 6251, and 8615.

The forms are selected and loaded to the monitor screen. You enter the data from your pencil-work copy via the keyboard to the blank spaces (line and column cells) of the form. The program calculates taxes, totals and limitations. These serve as a check on the keyboard input and assure accuracy and savings in time. The formats are approved by the IRS for filing, including an overprint on Form 1040, and provide for all lines shown on the Government forms. Returns may be saved to disk and easily revised and reprinted.

Your own AppleWorks (TM) program, an Apple //e, //c, or Laser 128 computer are required with 128K RAM, one or two disk drives and a printer. The program will be available by January 10, 1988.

The two disks cost $69 plus $3 packing and postage, $3.45 tax in Indiana. An Indiana disk is $39 plus $1.95. Pay by check. Order from QUALATRONICS, 6117 Norwaldo Avenue, Indianapolis, IN 46220, (317) 255-6117.

Novice Notes

Templates: What They Are and How to Use Them

by James Smith

If you talk to AppleWorks users for any length of time, you're likely to hear the word "template". What is a template? Why do people use them? How do you use a template?

What is a Template?

A template is a pattern. It's a file that has a structure, but not your personal data. For example, many AppleWorks owners send letters to credit card companies. Instead of writing your own letter, you can get an AppleWorks data disk that contains a sample letter. You bring the file onto your AppleWorks desktop, change its name (using the Apple-N command), move the cursor to the part of the letter that lets you describe why you are writing, enter your changes, go to the end of the letter and insert your name. Then you can print the letter and save a copy on your disk.

Templates serve two functions:

1. Templates save time. You no longer have to start from scratch when you develop a data base, spreadsheet or document.
2. Templates can improve your work. Hopefully, the template developer knows more about the area and spends more time developing the template than you would for your application.

(continued in the next column)

Give a Cook's Tour of AppleWorks

Nonnie's File Box

Ms. Nom de Plume presents 75 of her favorite recipes. Provides practical home application and tutorial on WP, SS, and DB files. Nonnie's SS template enables user to ADD and adjust serving size of OWN RECIPES. Recipes selected by ingredient, cooking method, characteristics, etc. 700 grocery items for customized lists. TWO reversible data disks. 35 Page manual with many AppleWorks tips. Requires 128K, printer.

$24.95 + $3.00 s/h **VISA/MC**
PA + 6% tax

plume software, inc
POB 2209
Altoona, PA 16603
814/942-7058

What Types of Templates Are Available?

AppleWorks is such a popular program that there are thousands of templates available from different sources. These templates include word processor documents, data base files, and complex spreadsheets that can do the accounting for a small business, maintain tax records, or calculate your personal income tax.

You can get AppleWorks templates from **NAUG**, local Apple users groups, various magazines, and numerous commercial vendors. But remember:

1. A template is a data file, not a program. Boot up AppleWorks and then bring the template in from the data disk as if you were recalling a file you prepared earlier. Do not try to boot your Apple with a template disk.
2. Change the name of the template using the Apple-N command before you enter your own data.

[James Smith is the Technical and Support Services Coordinator for NAUG.]

Quick Tip

Control-@ Symbols in Printer Control Codes

by Don de Halas

My printer requires a Control-@ as a command to activate certain features, such as Subscript Begin and Subscript End. When I bought version 2.0 of AppleWorks, I was dismayed to learn that I could not enter a Control-@ into a command string. Version 1.3 accepted that command. Fortunately, there is a way around this problem.

The trick is to enter your printer codes into version 1.3 of AppleWorks and then copy the file SEG.PR from version 1.3 onto version 2.0. Version 1.3 accepts those codes and version 2.0 will use the codes correctly once they are in the SEG.PR file.

ImageWriter // Superscripts and Subscripts: Revisited

by Terrence Davis

*Last month's issue of the **AppleWorks Forum** described how to get improved subscripts and superscripts on the ImageWriter // printer. Here's how to use the Copy //+ Sector Editor to make these changes.*

I read the Printer Primer article in the September 1987 issue of the ***AppleWorks Forum***. Having discovered the ImageWriter // instructions on how to obtain improved superscripts and subscripts, and having used the custom printer section to access color, mousetext, and to bold face entire documents, I wasn't going to bother with the improved super and subscripts. However, Ken Kashmarek's solution seemed like a logical patch to make, so I went to my //e to try it. He forgot to tell us something! I followed his instructions to BLOAD SEG.PR and got a "file type mismatch" error message.

A Different Approach

However, Ken's article included the data needed to make the changes to SEG.PR. So, I decided to use the Sector Editor from my Copy //+ program to patch SEG.PR. It's not hard to do, following the instructions in the Copy //+ manual, but if you don't want to search through them, here's how.

After booting Copy //+, copy the file SEG.PR from your working AppleWorks program disk onto a ProDOS formatted blank disk. Return to the main menu on Copy //+ and choose COPY, then BIT COPY, and respond to the question SLOT NUMBER? by typing the number of the slot in which your disk drive controller is located (slot 6 for 5.25 drives, usually).

Choose SECTOR EDITOR (page 79 of the Copy //+ manual) from the next menu and respond to the question ORIGINAL DRIVE? with the number of the drive with the copy of SEG.PR.

When the next display appears, type the letter S for "Scan". The screen will ask you SCAN FOR [H]EX OR [T]EXT? Type the letter H. The next line will instruct you to ENTER HEX. (At this point you need your September 1987 ***Appleworks Forum*** open to page 19). Type the first line of the ImageWriter / definition: 07 1B 54 30 and push the RETURN key. Your drive will come on and the display will show all the bytes that Ken lists in his table.

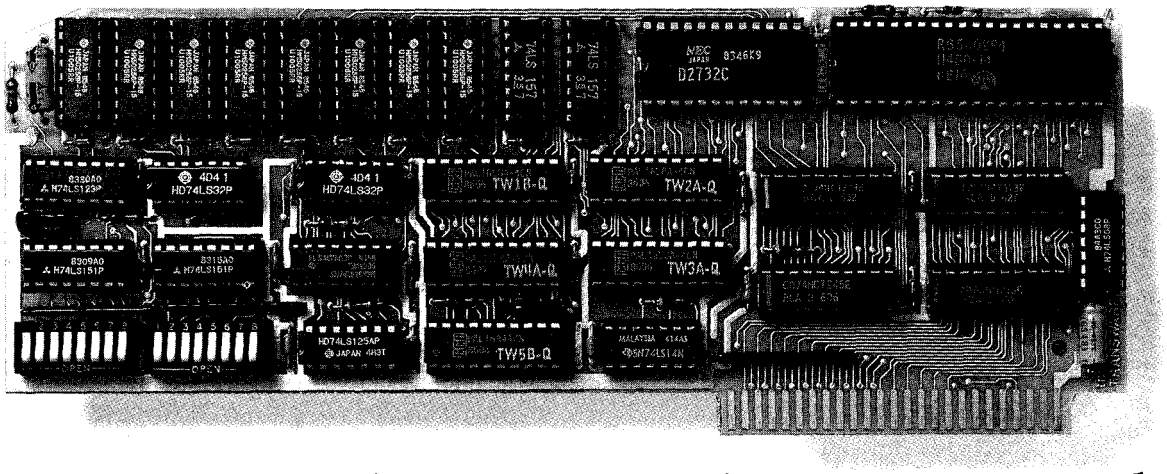
Use the I (up) J (left) K (right) M (down) keys to move the cursor to the first byte [07]. Type H for HEX, followed by the ImageWriter // Definition that Ken lists in the last column of his table.

Press the RETURN key after entering each byte (2 characters), and 00 for each byte which does not exist in the ImageWriter // definition. That is, starting at the 07 you enter 02 1B 78 00 00 00 00 00, remembering to press RETURN between each 2 characters. That will bring you to the "Superscript Off" definition area. Follow the same process until you have replaced everything in the third column in the table with the fourth column entries and 00's. Press [ESC] to get out of Hex entry.

Proofread your work and make any corrections, following the same process outlined in the two previous paragraphs. When you are sure your entry is correct, type W to write the revised file back to your disk. You will be prompted for track and sector numbers; press the RETURN key twice because you want to write back to the same location.

When your disk drive stops running, return to the Copy //+ main menu and copy your patched SEG.PR file onto your AppleWorks Program Disk. Now you are in business with true superscripts and subscripts. ▒

To boldly go at speeds no Apple has gone before.



Get TransWarp.™ The fastest accelerator you can buy for your Apple™ IIe, II, or II+.

Computing at warp speed!

It's an experience you shouldn't miss. And with TransWarp, you won't have to. Because TransWarp will run your software up to *3.6 times faster* — leaving other accelerators in the stardust!

No more waiting while your Apple™ slowly rearranges text or calculates spreadsheets. With 256K of ultra-fast RAM, TransWarp speeds up *all* Apple software — including AppleWorks, SuperCalc 3a, VisiCalc, and all educational software, graphics and games. And it's compatible with all standard peripheral cards (such as RamWorks and Apple memory cards), Profile and Sider hard disks, 3½" UniDisks, 80-column cards, modems, clock cards, mouses and more! You name it, TransWarp accelerates it. There's even a 16 bit upgrade chip available should 16 bit software become available for the Apple.

An important difference.

TransWarp's not the only speedup card on the market. But it's the only one that accelerates your Apple's main memory, ROM *and auxiliary memory.* And with more and more programs residing in auxiliary memory, buying anyone else's accelerator makes less and less sense because TransWarp speeds up software up to 3 times faster than other cards on the market because the others can't accelerate programs in auxiliary memory. That's why TransWarp is so much faster than the rest. Nearly all of today's more powerful programs run partially or completely in auxiliary memory; programs like AppleWorks, Pinpoint, Managing Your Money, SuperCalc 3a, BPI and Pascal, just to name a few. Why settle for a card that only accelerates part of memory? Get TransWarp, it accelerates all memory. TransWarp even works with most D.M.A. devices including the Swyft™ card.

There's one more difference. Since TransWarp doesn't use memory caching, you get consistent high speed performance.

A cinch to use.

Simply plug TransWarp into any slot in your Apple II, II+ or IIe —including slot 3 in the IIe. Instantly you'll be computing at speeds you only dreamed about before. And should you ever wish to run at normal speed, simply press the ESC key while turning your Apple on.

Since TransWarp is completely transparent, you won't need preboot disks or special software. It's ready to go right out of the package!

Speed = Productivity

Imagine the productivity gains you'll achieve when your programs are running over three times faster. TransWarp is so powerful, your Apple will make IBM PCs™ and even ATs™ look like slowpokes — whether you're planning taxes, plotting charts or playing games! Take a look at a few of the features that set TransWarp apart:

- 3.6 MHZ 65C02
- 256K of ultra-fast on-board RAM
- Accelerates main *and* auxiliary memory
- Low power consumption for cool operation
- Totally transparent operation with all software
- Plugs into any slot, including slot 3 on the Apple IIe
- Accelerated 16 bit option available
- Can run at full acceleration, half acceleration or normal Apple speed
- 5 year warranty

Satisfaction guaranteed!

Give *your* Apple the TransWarp advantage. With our risk-free 15-day money back guarantee, you have nothing to lose but wasted time. Call today!

TransWarp Accelerator $279
16 bit upgrade (may add later) $89

For fast response:

Call Applied Engineering, 9 a.m. to 11 p.m., 7 days at (214) 241-6060. MasterCard, VISA and C.O.D. welcome. Texas residents add 5⅛% sales tax. Add $10.00 if outside U.S.A.

Or mail check or money order to Applied Engineering, P.O. Box 798, Carrollton, TX 75006.

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Eastern Zone Volunteer Listing

by Mike Hoppe

The response to **NAUG**'s Members Helping Members program is outstanding; so far, more than 100 members volunteered to provide free AppleWorks consulting help to their colleagues. The list is now too long to publish each month in the ***AppleWorks Forum***. This issue of the ***Forum*** includes a listing of all updated volunteers from the Eastern Time Zone. Regional listings will continue to appear in future issues of the ***AppleWorks Forum***.

There are two parts to this insert– a list of the volunteers' phone numbers with the appropriate times to call, and a chart indicating the type of help available from each member. The list of volunteers begins on this page and continues on page 14. The chart begins on page 12.

Instructions

The categories for help are listed down both sides of the chart. Along the bottom of the chart is a list of the members willing to offer technical assistance, the state in which they live, and a reference number. Use the reference number to help you find the volunteer in the list. The chart is organized so the volunteers are separated into time zones.

To use the chart, locate the type of help you want. Then look across until you see a "•", which indicates a person is comfortable helping with problems in that area. Use the reference number along the bottom or top of the chart to help you find the phone number(s) for that person. Be prepared to pay collect charges if your consultant must return your call.

1 Dawn Andrews, Muskegon, MI
616/ 755-4308... Daily after 4pm

2 Jim Anker, Hazel Park, MI
313/ 542-3910 ext 344... M-F 8am-4pm
313/ 391-0033... M-F 5-10pm,

3 Mark Ball, Paris, OH
216/ 862-3277... M-F after 6pm
216/ 627-7606... M-F 8am-3pm

4 Wm Beasley, N. Olmsted, OH
216/ 777-7700 ext. 282... 8am-4pm
216/ 933-4408... Answ. mach.
CompuServe– 71106,574

5 Les Blatt, Maplewood, NJ
CompuServe– 73647,3157

6 Stanley Boler, Knightstown, IN
317/ 345-5663... M-F 5-11pm

7 Larry T. Brooks, Tampa, FL
813/ 874-7355... M-F 6-9pm

8 David Chesebrough, Sewickley, PA
412/ 741-5129... M,T,Th 7-9

9 Joe Connelly, Livonia, MI
313/ 421-8729, Daily 9am-9pm
NAUG # 21

10 Peter Crosta, Nutley, NJ
201/ 667-6369... M-F 5- 9pm
201/ 667-2928... S-S 8am - 9pm
201/ 266-4335... M-F 8:45am- 3pm

11 Arthur Daniel, Warren, MI
313/ 445-7142... M-Th 7am-4pm
313/ 445-7105... M-Th 7am-4pm

12 Warren L. Downes, Yorktown, VA
804/ 898-8386... M-F 12-4pm
804/ 898-1881... M-F After 4pm, Sat. after noon

13 David M. Edwards, Camden, NJ
609/ 966-6767... M-F 9am-5pm
609/ 365-1359... M-F 6-9pm

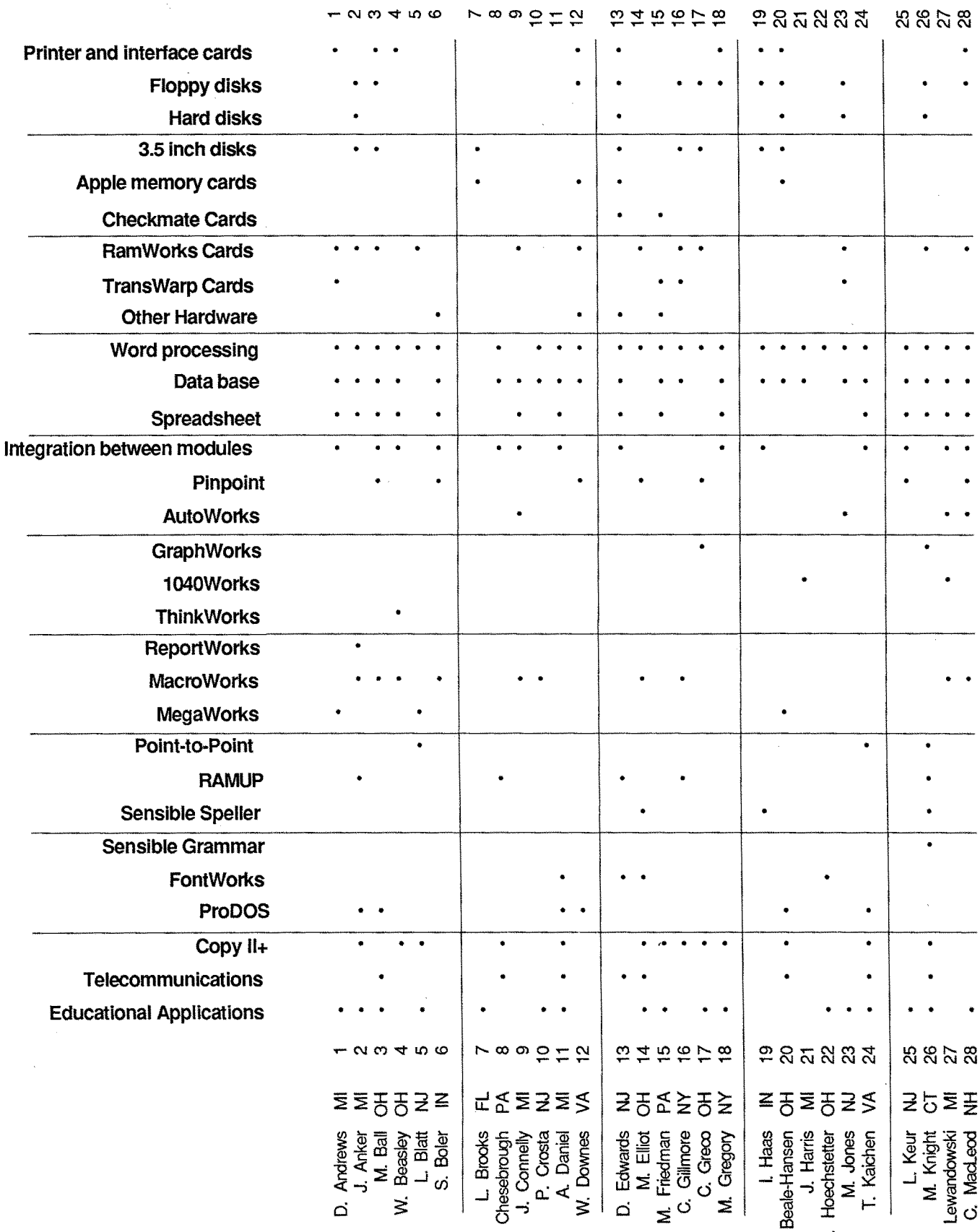
14 Mark Elliot, Hudson, OH
216/ 686-2280... M-F 9am-5pm
216/ 653-5006... S-S 6-11pm

15 Martin Friedman, Philadelphia, PA
215/ 473-6135... M-Sat 3-10pm
CompuServe– 76676,1057

16 Cynthia B. Gillmore, Johnstown, NY
518/ 762-8483... M-F 7am-5:30pm, S-S all day
518/ 725-4016... M-F 8am-4pm
518/ 661-6277... SummeR, M-F 6-10pm

(Continued on page 14)

Members Helping Members Reference Chart



Time Zone

Members Helping Members Reference Chart

	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
	D. Menges	B. Neef	R. Netro	J. Nicoll	L. Nixon	J. O'Connor	J. Perlish	J. Policy	D. Pratt	Q. Computers	P. Ritchey	M. Robinson	R. Romanowicz	P. Ross	W. Sanderson	S. Schneider	N. Shaffer	M. Spurrier	T. Stanius	J. Sulsona	M. Sutter	B. Theil	S. Thomas	R. Zajac
	NY	MI	OH	NY	NJ	MI	PA	FL	PA	MI	OH	MI	MD	MI	VA	NJ	CT	MD	FL	GA	TN	MI	NJ	MI
	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
Printer and interface cards					•																			
Floppy disks	•									•	•			•			•		•					
Hard disks			•		•																			
3.5 inch disks	•		•								•	•	•						•	•		•		
Apple memory cards													•							•				
Checkmate Cards													•											
RamWorks Cards			•	•					•								•		•					
TransWarp Cards									•				•		•				•					
Other Hardware																								
Word processing	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•
Data base	•	•	•	•	•	•		•	•	•	•	•			•		•	•	•	•	•		•	
Spreadsheet	•	•	•	•	•	•		•	•	•	•	•	•	•			•	•	•	•	•		•	
Integration between modules	•	•	•					•	•	•	•	•	•					•		•			•	
Pinpoint				•	•		•		•			•				•						•		
AutoWorks						•			•															
GraphWorks						•			•					•										
1040Works									•									•						
ThinkWorks									•															
ReportWorks																								
MacroWorks									•	•			•		•	•		•			•			
MegaWorks			•						•											•				
Point-to-Point																								
RAMUP						•		•					•				•							
Sensible Speller	•	•				•		•	•	•			•			•								•
Sensible Grammar	•					•			•							•								•
FontWorks									•			•					•							
ProDOS								•												•		•		
Copy II+	•		•			•		•	•	•		•	•		•	•		•				•	•	
Telecommunications				•			•				•													
Educational Applications	•				•		•		•	•			•				•		•	•			•	

Members Helping Members...

17 Carman Greco, St. Clairsville, OH
614/ 695-5026... M-F 3-9pm, S-S 9am-9pm

18 Sister Mary Gregory, SSJ, Watertown, NY
315/ 782-3460... Daily 3-9pm
315/ 788-4670... 2-3pm

19 Irvin M. Haas, Carmel, IN
317/ 848-0050... M-F 3:30-10pm, S-S 9-pm

20 Jessie Beale-Hansen, Cincinnati, OH
513/ 921-1800... M-F 9am-3pm
513/ 751-6834... M-F 7-9pm

21 Jane Harris, Grand Rapids, MI
616/ 458-2653... Sat 12-11pm, Sun 10am-11pm

22 Florence Hoechstetter, Columbus, OH
614/ 231-3992... Daily 7-9:30pm

23 Matthew A Jones, Neptune, NJ
201/ 774-0983... M-F 6-8pm

24 Troy A. Kaichen, Colonial Heights, VA
804/ 526-6157... 9am-11pm
Easy Link– 62021118

25 Link Kuer, Edison, NJ
CompuServe– 76237,302

26 Martin Knight, Middletown, CT
203/ 346-9698... M-F 6-9pm
GEnie- M.KNIGHT

27 Richard Lewandowski, Ann Arbor, MI
313/ 426-5031... M-S 6-9pm
313/ 482-9494... M-F 9am-4pm
313/ 482-8090... Anytime
NAUG #1

28 Christine MacLeod, Concord, NH
603/ 224-0520... M or Th 7-9pm

29 Don Menges, Rochester, NY
716/ 544-9398... 8-11pm
CompuServe– 75776,443

30 Bill Neef, Grass Lake, MI
517/522-4689... 8am-10pm

31 Robert J. Netro, Canton, OH
216/477-3667... 8-11am/1-4pm

32 James L. Nicoll, Pittsford, NY
716/ 546-6732... M-F 7:30am-2pm
716/ 381-9480... Eve. & S-S

33 Linda S. Nixon, Chatham, NJ
201/ 635-0973... M-F 5-9pm, S-S 11-5pm

34 J. O'Connor, Rochester, MI
313/ 853-1260
NAUG #99

35 Joel Perlish, Havertown, PA
215/ 789-7673... M-F 8pm-10pm, S-S Anytime

36 Joe Policy, Lantana, FL
305/ 586-1111... M-F 9am-5pm
804/ 973-7416... before 10pm
804/ 973-4957... (if #2 is busy) before 10pm
CompuServe– 76127,24

37 Dr. Don Pratt, Bloomsburg, PA
717/ 389-4639... M-F 9-4

38 Quality Computers, Grosse Pt., MI
313/ 885-4270... 9am-5pm
313/ 885-4215... 9am-5pm

39 Patricia Ritchey, Bowling Green, OH
419/ 372-7038... M-F 8am-4pm
419/ 673-0040... Evenings & S-S

40 Mike Robinson, Royal Oak , MI
313/ 585-5027... Daily after 6pm

41 Ronald Romanowicz, Glencoe, MD
301/ 472-4800... 8am-4pm
301/ 472-2983... 4-Midnight

42 Pete Ross, Wayne, MI
313/ 728-8720... 24 hr. Answ mach. leave time to return call

43 William W. Sanderson, Merrifield, VA
703/ 352-1568... M-F 6-10pm
703/ 820-8550... Noon

44 Stuart Schneider, Teaneck, NJ
201/ 568-3336... M-F 9:30am-5:15pm
201/ 261-1983... M-F after 6pm, W 10am-11pm

45 Newton Shaffer, Gales Ferry, CT
203/469-9716... Any Day 4-11pm

46 Michael Spurrier, Baltimore, MD
301/ 955-0263... Evenings after 8pm
301/ 955-5938... 11am-1pm on school days

47 Thomas J. Stanius, Opa Locka, FL
305/ 375-2095 ext. 8691... M-F 8am-5pm
305/ 624-6142... M-F 6pm-Midn't, S-S All Day

48 Jim Sulsona, Doraville, GA
404/ 455-0853... Any Day 9am-Midnight

49 Major Michael Sutter, Clarksville, TN
502/ 798-8203... 6am-2pm
615/ 552-0973... 5-9pm

50 Brian Theil, Taylor, MI
313/ 287-4608... M-F after 6, S-S Anytime
CompuServe– 71320,221

51 Suzanne Thomas, Tinton Falls, NJ
201/ 842-7699... 9am-3pm, 7-9pm
CompuServe– 76012,1145

52 Richard P. Zajac, Mt. Clemens , MI
313/ 465-2615... M-F 9am-1pm

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- Speed
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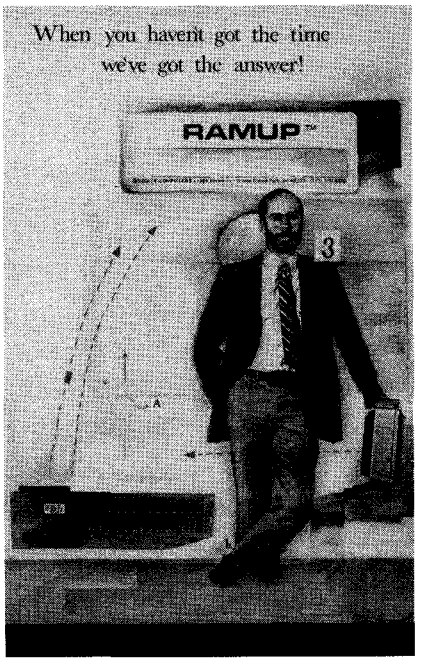

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Quicken: A Review

by Robert McRoberts

This is the first of two articles about Quicken, a popular program that writes checks, maintains your checkbook register and prepares tax reports. This month, Robert McRoberts describes the program. Next month, George Sall describes tricks to help you use Quicken in conjunction with AppleWorks.

If you like AppleWorks, you should consider Quicken, the check-writing program from Intuit. It not only writes your checks; it makes it easy for you to balance your checkbook. In addition, Quicken interfaces so nicely with AppleWorks that I couldn't keep myself from doing what I had always dreaded—starting a family budget. But more about that later.

Quicken is not a comprehensive financial program. It does not track money market funds, keep a record of your net worth, maintain records of your cash expenditures, nor help you decide how much life insurance to buy. Quicken's strengths are its practical design (if you can write out a check, you can use Quicken), its ability to maintain your tax records, and its price; under $30 mail-order.

Quicken's Features

What Quicken does, it does well. For example, Quicken can remember the payees and amounts of checks you write regularly and write them for you automatically. You can instruct Quicken to remember parts of a check so it can write those checks whose dollar amount changes from month to month. You can also use Quicken to find out how much the family spent on phone bills the past year or any part of the year. And if you want to print out the figures so you can hang them on your daughter's bulletin board, Quicken will do it.

When you boot up, Quicken shows the following Main Menu on a file folder (like AppleWorks):

```
Main Menu
1. Write Checks
2. Use Check Register
3. Balance with Bank Statement
4. Search and List
5. Backup Data Disk
6. Transfer Data to AppleWorks
```

Choosing the "Write Checks" option brings up a blank check on your screen for you to fill out. When you enter the amount of the check, Quicken automatically displays the dollar amount in words. Press "Return" when the "Record" prompt appears and the check is entered in the check register off-screen. A new blank check appears each time you record a check. When you've entered all your checks, press Apple-P to print your checks (many keystrokes are similar to AppleWorks). Quicken will prompt you for a beginning check number, ask if you want to print a sample, then print all the checks you entered. Quicken will ask if all the checks were printed correctly and give you the option to correct an error.

Writing Checks Away from Home

This is a great system for writing checks in batches, as you do when paying bills monthly or bi-monthly. But what about the other checks you write? When I need to write a check away from home, I record it on the back of a card I keep in my wallet. When I've written several checks, I boot Quicken, choose option 2, "Use

(continued on the next page)

Check Register" from the Main Menu, and record those checks.

When it comes time to balance your checkbook, Quicken leads you through a process virtually identical to balancing with a paper register. If your account doesn't balance, Quicken asks a few questions to help you. Balancing has never been so easy.

Maintaining Budget Data

Every three months I run off a family budget spreadsheet, using numbers imported from Quicken to AppleWorks. First I set up a basic spreadsheet: I begin with "Our Budget" from the "AppleWorks Sample Files" disk that comes with AppleWorks. I change the rows and columns as needed and enter "transfer labels" so Quicken can read values from the check register and record them on the spreadsheet. When I choose # 6, "Transfer Data to AppleWorks" from Quicken's Main Menu, Quicken produces a summary of expenses in spreadsheet form. [*Ed: Next month's article on Quicken will describe this process in greater detail.*] It's a revealing summary, especially when I learned that 20% of my income sometimes goes to maintaining and operating the family cars.

Someone once wrote that the computer will not make an unorganized person more organized. Quicken is a program that goes a long way toward rebutting that theory.

[Ed: Quicken is available for $49.95 from Intuit, 540 University Avenue, Palo Alto, CA 94301. Intuit has a money-back guarantee. You can also purchase the program at a significant discount from mail order dealers. Quicken is popular with some NAUG members who report it is easy to use and helps them track their financial records. However, other members report that the program is less than ideal because (1) some of its modules operate slowly, and (2) Quicken keeps records for only one checkbook; not credit card records, multiple checkbooks, or records of your cash expenditures.]

[Robert McRoberts is Coordinator of Creative Writing at Roger Williams College in Bristol, RI.]

How to Line Up Dollar Amounts in Spreadsheets

When you format numbers in Dollar format in the AppleWorks spreadsheet module, AppleWorks expresses negative numbers by surrounding those numbers in parentheses. For example, "($4.30)" represents a negative number. Whenever you format a cell to contain numbers in dollar format, AppleWorks reserves the last space in the cell for the closed parenthesis in case the number you enter is negative. Usually this isn't a problem. If all numbers in a column are specified as dollar format, they will be correctly aligned. However, consider the example in Figure 1, where you want the dollar sign to appear next to the first numbers in a column but not in the succeeding numbers.

Figure 1: Numbers Not Aligned because of Dollar Format

```
======A=======B=======C======D=====
1|  $45.66   $78.99   $55.33
2|    98.66    33.45    23.99
3|    44.55    14.75    34.76
4|    23.56    44.89    34.66
```

To get the remaining numbers to line up with the first row, use the Commas format in rows 2-4. The Commas format leaves space for the same parentheses but does not display a dollar sign. Figure 2 shows the output that appears when rows 2-4 are specified as Comma format.

Figure 2: Numbers Aligned Using Comma Format

```
======A=======B=======C======D=====
1|  $45.66   $78.99   $55.33
2|    98.66    33.45    23.99
3|    44.55    14.75    34.76
4|    23.56    44.89    34.66
```

[Ed: Our thanks to Apple Computer for this Quick Tip.]

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How to Get Footnotes in Documents

by Warren Williams

It's obvious that Robert Lissner made many compromises when he designed AppleWorks. As a result, he gave us a program that is easy to use, but does not offer all the features of a stand-alone word processing program.

One of the things AppleWorks does not offer is a footnote system; a way to enter footnotes anywhere in a document and automatically number and place them at the bottom of the appropriate pages. However, you can use the flexibility of AppleWorks to "work around" this limitation.

One Line Footnotes

It's relatively easy to get AppleWorks to automatically enter a footnote that fits on a single line; you use the Footer Command (FO) available on the word processor Options Menu. Enter the Footer Command and your one-line footnote immediately below the paragraph containing the footnote reference. *[Ed: See the Word Processor Tips article "How to Print Page Numbers" in the July 1987 issue of the **AppleWorks Forum** for information on how to use the Footer Command.]*

How to Print Multiple Line Footnotes

Unfortunately, most footnotes are more than one line long. Since you cannot enter more than one line with the Footer Command, you need a more complex strategy to trick AppleWorks into putting the footnotes at the bottom of the appropriate page.

The technique involves a number of steps, but it's not difficult. The procedure is to store your footnotes in a separate document and use the clipboard to move the footnotes to the bottom of the appropriate pages when you're done typing.

Here's how:

1. Create a second word processor document called "FOOTNOTE". Format this file so it matches the formatting of the original text document.

2. When you want to insert a footnote in your original document, insert a "special character" (any character you would not normally use in your writing; e.g., an ampersand) followed by a Superscript Begin Command, the number you want assigned to that footnote, and a Superscript End Command. (Later you will use the Find Command to locate the special character when you merge the footnotes into the document.)

   For example, the first footnote reference in your article would look like this:

   ```
   "Four score and seven years ago..."&^1^.
   ```

3. Use the Apple-Q command to switch to your FOOTNOTE document and issue an Apple-9 command to move to the end of the document.

4. Enter the Subscript Begin Command, the footnote number, the Subscript End Command, and the text of your footnote.

5. Use the Apple-Q command to switch back to your text. Continue your writing and footnoting as described in steps 2-4 above.

6. When you complete your typing and editing, issue an Apple-S command to save your document. Also save your original FOOTNOTE file.

7. Get your document on the screen, issue an Apple-N command, and change the name of

(continued on the next page)

the file containing your manuscript. Now you have the original file on the disk and a working copy on your desktop. Do all the remaining work in the working copy of the document. In that way, if you decide to add or delete paragraphs or change the type style of the document, you have an original, footnote-free copy of the document. Otherwise, you must delete all the footnotes when you change the pagination of your document.

8. Switch to the FOOTNOTE document and note the number of lines in the first footnote. Use the Apple-M command to move the first footnote onto the clipboard.
9. Switch to the document and use the Find command (Apple-F) to find the first special character.
10. Delete the special character.
11. Issue an Apple-K command to calculate the page breaks.
12. Move the cursor to the line above the page break and press the up-arrow key once for each line in the footnote. Press the up-arrow key three more times to allow extra space between the text of the document and the beginning of the footnote.
13. With the inserting cursor on the screen, press the RETURN key three times to insert three blank lines. Enter a string of underscore characters in the middle of those lines so you have an underline between the text of your document and the footnote.
14. Use the Copy Command (Apple-C) to copy the footnote "From the clipboard".
15. Insert a New Page Command after the footnote.

Repeat steps 8-15 for each footnote.

The technique appears cumbersome, but it works. You can simplify the processes by developing macros for the repetitive steps. If you ever wanted an excuse to get started with a macro program, here it is.

*[Dr. Warren Williams teaches courses in the Educational Technology program at Eastern Michigan University. He is a technical advisor to **NAUG**, a frequent contributor to the **AppleWorks Forum**, and conducts AppleWorks seminars throughout the country.]*

*[Ed: **NAUG** recently received a copy of WriteWorks ($39.95 from WAR Software), a stand-alone program that adds footnotes and other features to AppleWorks. We will review WriteWorks in a future issue of the **AppleWorks Forum**.]*

A Better Way to Handle Footnotes

As an experienced computer user, you know it's sometimes easier to accommodate your procedures to your software instead of trying to find software that matches your style. The same is true of footnoting. You might prefer to change your style than change your program.

While AppleWorks does not readily accept the traditional bottom of the page footnotes, there are some accepted stylistic alternatives. Probably the best alternative is "endnotes". Endnotes appear in numerical order on a separate page at the end of your document.

The best way to prepare endnotes in AppleWorks is to create a separate AppleWorks document on the desktop (I call mine "ENDNOTES"). When you want to create an endnote, use the Apple-Q command to switch between your text and endnote file. Enter your endnote and use the Apple-Q command to return to your document.

When you are ready to print, insert a New Page Command to the beginning of the ENDNOTE file and use the clipboard to move the ENDNOTE file to the end of your word processor document. –Warren Williams

Spreadsheet Tip

Limitations of the AppleWorks Spreadsheet

by Roger Engle

Ever wonder why your AppleWorks spreadsheet won't accept an entry? Perhaps you are trying to exceed some of the undocumented limitations of that module.

When using any tool, it is important to know what the tool can and cannot do. AppleWorks is no exception. In this article I will describe some of the undocumented limitations of the AppleWorks Spreadsheet. When possible, I will describe how to work around these limitations.

The limits of the AppleWorks spreadsheet are imposed by either the editor (the editor controls what is entered from the keyboard) or the data structure (the form which the spreadsheet is stored in memory and on the disk). Usually you hit the limit of the editor before reaching the limit of the data structure. However, under certain circumstances you can fill the data structure and have AppleWorks beep at you, or refuse to accept your formula. That is what we will address in this article.

The only spreadsheet constraint mentioned in the *AppleWorks Reference Manual* is the size of the spreadsheet; i.e., the spreadsheet is limited to 999 rows and 127 columns. However, there are many undocumented limitations on what can be entered and displayed in the cells.

Limitation on Label Size

Any spreadsheet cell can contain a label, a value, or a formula. When you enter a label in a cell, you get the prompt: "Label:". The prompt consumes 7 spaces, leaving space for entry of up to 70 characters. However, labels can be up to 78 characters long. The trick to entering longer labels is to first enter the 70 characters that fit and press the RETURN key. Then use the Apple-U command to edit the entry and add up to eight additional characters. While the data structure permits a maximum of 127 characters in an AppleWorks entry, the editor limits you to a maximum of a 78 character label.

Limitations on the Size of Numbers

In *Command Performance: AppleWorks*, Charles Rubin writes, "If a number is larger than 10^{20}, AppleWorks won't display the number, but will store it and calculate with it. If a number has more than seven decimal places, AppleWorks rounds the number to the seventh decimal place, and stores and calculates [based on] the rounded number." Mr. Rubin is describing the Standard Apple Numerics Environment (SANE) used by AppleWorks. *[Ed: See the August 1987 issue of the **AppleWorks Forum** for more information about how AppleWorks uses SANE.]* AppleWorks uses SANE double precision numbers for arithmetic within the spreadsheet.

For the technically minded, a double precision number uses 8 bytes (64 bits): One sign bit, eleven exponent bits, and 52 bits for the mantissa. One ramification is that 2^{53} or 9,007,199,254,740,992 is the largest number that AppleWorks can handle reliably.

Generally speaking, you can count on 15 or 16 digits of accuracy when using the spreadsheet. To see what happens with larger numbers, open a column to 25 characters (using Apple-L) and enter 666...666 (20 sixes). When you press the RETURN key AppleWorks will display 66,666,666,666,666,663,936. The maximum number that SANE can handle is about $+1.7 \times 10^{308}$.

How AppleWorks Handles Decimal Numbers

Mr. Rubin is incorrect in his assertion that

(continued on the next page)

AppleWorks rounds decimal numbers to seven decimal places and calculates based on the rounded number. You can see his error if you enter .00000002 in cells A1 through A10 and enter the formula @SUM(A1.A10) in cell A11. Each of the first 10 cells will display .0000000 but A11 will contain .0000002. AppleWorks rounds off the decimal number to 7 places but retains the original value (not the rounded value) and uses the original value to calculate.

Constraints on Formulas

In addition to these limitations on the size of the data entries into a cell, there are two constraints on entering formulas into a cell. One is the editor's limitation of 78 characters per cell. The other is the data structure constraint of 117 bytes per formula. The editor's constraint is the same as that described above for label entries. So, we need only to look at limitations of the data structure of a formula in a cell.

Each value entry begins with a control byte (see Figure 1). If the control byte (C) is greater than 128, it indicates that C-128 is the number of columns to skip to the next entry. If the control byte is less than 128, it indicates the number of the following bytes that define the cell.

The second byte indicates the format that is to be used to display the entry (e.g., appropriate, fixed, etc.). The third byte indicates the number of decimal places in the display. The next eight bytes, 4 through 11, contain a double-precision SANE floating point number; the most recent evaluation of the formula. This leaves only 117 bytes, maximum, for the formula.

Figure 1: Spreadsheet Cell Structure

```
|_|  |_|  |_|  |_|_|_|_|_|_|_|_|
 1    2    3              4
```

1. Control byte. It contains either the number of columns to skip or the number of the following bytes (max 127) that define the cell formula.
2. Format.
3. Number of decimal places.
4. Eight byte SANE number; most recent evaluation of formula.

However, AppleWorks does not use one byte for each character in a formula. AppleWorks uses tokens; i.e., an entire function is stored in one byte. Figure 2 lists the tokens. We can see from Figure 2 that a function requires 1 byte plus a byte for each symbol (+, -, *, (,), ...). Each referenced cell requires 4 bytes; the cell pointer token (FE) followed by a column byte and two row bytes.

Figure 2: Spreadsheet Tokens

Token	Function	Token	Function
D9	@ROUND	EE	<
DA	@OR	EF	=
DB	@AND	F0	>
DC	@SUM	F1	<
DD	@AVG	F2	,
DE	@CHOOSE	F3	^
DF	@COUNT	F4	)
E0	@ERROR	F5	-
E1	(RES.)@IRR	F6	+
E2	@IF	F7	/
E3	@INT	F8	*
E4	@LOOKUP	F9	(
E5	@MAX	FA	- UNARY
E6	@MIN	FB	+ UNARY
E7	@NA	FC	...
E8	@NPV	FD	8 byte SANE follows
E9	@SQRT		
EA	@ABS	FE	3 byte ROW/COL pntr
EB	(RESERVED)		
EC	<>	FF	END of row marker
ED	>		

So, every number entered into the AppleWorks spreadsheet requires nine bytes; one for the token (FD) which indicates that an eight byte SANE number follows and eight bytes for the SANE number. It requires nine bytes for the number whether it is 1, or 0, or 3.141592654. When writing a long formula, it is clearly more efficient to reference values in other cells than to enter the numbers directly into the formula.

If you know the constraints of the editor and the data structure, you can optimize your formulas and pack more power into each cell.

Limitation on Entries

There is one additional consideration: The limitation on how much you can put in any single spreadsheet row.

While there is no limit to the number of cells in a row that can contain entries, there are finite limits on the total size of all formulas, values and/or labels that can be stored in any single row.

(continued on the next page)

AppleWorks versions 1.3 and earlier are limited to 2K of formulas, values and/or labels per row. One of the advantages of Version 2.0 of AppleWorks is its expansion to permit up to 10K of entries into each row. This limit is not affected by the amount of memory in your Apple; owners of one-megabyte memory cards suffer under the same constraint imposed on those of us working with 128K machines.

AppleWorks insures that you will not exceed this limit. It automatically deletes all additional entries in the offending row(s) and displays the message "Some cells were lost from row x."

How to Fit More into Each Row

There are at least four ways to make more efficient use of the spreadsheet space available and, consequently, fit more formulas, data and/or labels into each row. Try these techniques:

1. Use functions whenever possible. The formula `@SUM(A1...A5)` uses less memory than the formula `+A1+A2+A3....`
2. Design your formulas to use a cell reference when you want to enter a constant. For example, Figure 3 demonstrates an inefficient and efficient way to calculate the sales tax on a purchase.

   Cells B4 and B5 in Figure 3 both contain formulas to determine 5% of the sales price of an item. The formula in cell B4 contains a numeric constant and uses more memory than the formula in cell B5.

Figure 3: Example of Formulas

```
======A==========B==========C========D===
1|      .05
2|
3|   Price      Sales Tax      Cost
4|  $25.00      +A4*.05        +A4+B4
5|  $25.00      +A4*A1         +A5+B5
```

3. Divide long formulas so they fit into two or three different rows. For example, you can compute the numerator of a fraction in Row 4, the denominator in Row 5 and do the division in Row 6.
4. Design your spreadsheet so it is long, not wide. There is no limit to the amount of memory allocated to any single column.

Review of Spreadsheet Limits

In summary, these are some of the known limitations of the spreadsheet module:

1. You cannot enter more than 78 characters in any single label or formula.
2. You do not get reliable results with numbers larger than 16 digits.
3. AppleWorks rounds decimal numbers to no more than the seventh digit but uses the original value in its calculations.
4. No formula can use more than 117 bytes.
5. No row can contain more than 10K of formulas, values and/or labels (2K for AppleWorks versions prior to 2.0).

Additional AppleWorks spreadsheet limitations include the following:

1. The maximum number of rows you can move to the Clipboard is 250.
2. The maximum number of columns you can move to the Clipboard is 125.
3. The maximum length of a FIND string is 25 characters.
4. The maximum number of rows or columns that can be inserted at one time is 9.
5. The maximum dimension of a spreadsheet is 999 rows and 127 columns.
6. The maximum column width is 70 characters.
7. The maximum allowable number of bytes in "Send code to printer" option is 13.

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